



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/541,432

07/05/2005

Ermanno Filippi

9526-57

6387

30448

7590

03/04/2008

AKERMAN SENTERFITT

P.O. BOX 3188

WEST PALM BEACH, FL 33402-3188

EXAMINER

BHAT, NINA NMN

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

03/04/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/541,432	<b>Applicant(s)</b> FILIPPI ET AL.	
	<b>Examiner</b> N. Bhat	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 August 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8-14-07; 7-5-05</u> .   | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. The abstract of the disclosure is objected to because the abstract should be in a single paragraph following the claims on a separate sheet which is directed to the claim subject matter. The abstract should not include the World Patent Figure, or any of the indicia relating to the World Patent. Correction is required. See MPEP § 608.01(b).

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agarwal, EP 0094208 in combination with Filippi et al., EP 1153653.

Agarwal teach the invention substantially as claimed. Specifically Agarwal teach a temperature controls system which controls the temperate of a reactor by controlling in flow lines and using parameters of known quantities for specific heat of the feed, the effluent and heat of vaporization and reaction to calculate a coolant flow rate set point. The system and method as taught by Agarwal includes a reactor having a feed line for reactant and an effluent line for the product, a feed flow transmitter connected to the feed line for measuring the reactant

Art Unit: 1797

flow; a effluent flow transmitter which is connected to the effluent line for measuring the flow of product from the reactor; a feed temperature transmitter connected to the feed line for sensing the reactant temperature, and effluent temperature transmitter for measuring the product temperature. A reactor temperature transmitter which measures the temperature of the reactor, a concentration transmitter connected to the effluent line for measuring the concentration of product in the effluent line, a coolant flow line to the reactor for supplying coolant to the reactor at a coolant flow rate, a coolant flow control means and circuit means that connects to all of the transmitters and to the coolant flow control means for controlling the flow of coolant to the reactor according to the coolant flow signal which is connected to receive quantities proportional to the heat of reaction for at least one reaction in the reactor, specific heats of the reactant and product and the heat of vaporization of the coolant.[Note the abstract, Page 3, line 1-30 and The heat and temperature and flow control algorithms as taught in Agarwal is fully capable of setting the speed of the heat exchange fluid inside the respective heat exchange within predetermined value so that the heat exchange coefficient inside the heat exchanger is less than the heat exchange coefficient in the catalytic bed.

However, Agarwal does not teach that the two heat exchanger is disposed within catalytic bed nor the specific relationship that the heat exchange coefficient inside the heat exchangers is equal to or less than  $2/3$  of the heat exchange coefficient inside the catalytic bed.

Filippi et al. '653 teach a fixed bed reactor for carrying out exothermic or endothermic reactions which includes a heat exchanger (9) embedded in a catalytic layer (10).[Note Paragraph[0023] Filippi et al. teach the construction arrangement of the heat exchangers within the reactor provides an isothermal reactor having high heat exchange degree that allows an optimum control of the temperature to the advantage of higher conversion yield and improved or lowered energy consumption. Filippi et al. teach that the high heat exchange efficiency inside

the reactor allows recovering or supplying heat with smaller temperature differences between there reactant fluid and heating or cooling fluid. The construction and arranged provides a smaller gradient of temperature inside the catalytic layer between two adjacent heat exchange plates thereby achieving a greater uniformity of temperature inside the catalytic layer.[Note [0030]]. The reactor as described by Filippi et al. is fully capable of carrying out chemical reaction sin pseudo-isothermal conditions.

It would have been obvious from the combined teachings of Agarwal and Filippi et al. to provide a temperature control system which is capable of adjusting the temperature inside a reaction zone of a catalytic reactor, includes probes/sensors for measuring the temperature between zones between the heat exchanger surface and catalyst and being capable of controlling the flow rate of the fluids inside the heat exchanger thereby modifying the heat exchange coefficient. It is maintained that the control system and algorithms described by Agarwal is capable of controlling the reaction temperature in a catalytic bed of a reactor in which the exchange is carried out so as to allow the transfer of the larges possible amount of heat between operating fluid and catalytic bed and maximizing the heat exchange coefficient inside the exchangers. Agarwal specifically teach sensing input and output streams, flow streams within the reactor and within the heat exchanger and manipulating the heat exchange fluid streams which provides conditions within the reactor to maximize and optimize the yield of reaction and reaction conditions. To use the control system in a reactor taught by Filippi wherein the reactor is specifically designed to operate under isothermal conditions which includes a fixed bed reactor, the heat exchangers disposed within the reactor and wherein the conditions of the reactor are controlled so that chemical reaction takes place in a pseudo isothermal conditions wherein the heat exchanger is crossed by a respective operating fluid immersed in the catalytic bed renders applicant's invention as a whole obvious and a

permissible substitution to one having ordinary skill in the art at the time the invention was made.

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. EP 1060788 teach and isothermal reactor for carrying out heterogeneous exothermic or endothermic reactions. Gartside teaches a fixed bed reactor wherein the temperature of the heat exchanger is controlled. Saruwatari teach a method of controlling the temperature in a two fixed bed adiabatic reactors. Johnston et al. teach a chemical reactor comprising a reaction zone containing a catalyst bed and heat exchanger means in operative contact with the reaction zone, the heat exchanger is formed from a plurality of superposed metal plates. Girod et al. teach a process and apparatus for controlling reaction temperatures wherein the process indirectly contacts a reactant stream with a heat exchange stream using an arrangement of corrugated heat exchange plates to control temperature conditions by varying the number and/or the arrangement of the corrugations along the plates.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Bhat whose telephone number is 571-272-1397. The examiner can normally be reached on Monday-Friday, 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. Bhat/  
Primary Examiner, Art Unit 1797